CHAPTER 2

Proposed Action and Alternatives

2.1 Introduction

This section contains a description of the two alternatives being considered in this EIS: the Proposed Action and No Action.

2.2 No Action

In the No Action Alternative, BPA would decide not to provide the requested connection to the regional power grid or BLM would decide not to provide an easement for construction of an electric transmission line across Federal lands. Without these approvals, the proposed Energy Facility would not be feasible. Thus, in the No Action Alternative the proposed Energy Facility would not be built.

2.3 Proposed Action

In the proposed action, BPA would provide an interconnection to the regional power grid and BLM would grant an easement allowing the power line to be built on Federal lands. The Energy Facility would be built and operated by the project proponent. It would consist of a 1,160-MW natural gas-fired, combined-cycle power generation plant. Based on the conditions of the electric power market, the project proponent may decide to construct the facility in one or two phases.

A new electric transmission line, approximately 7.2 miles in length, would be built by the project proponent and would deliver electric power from the Energy Facility to the regional power grid at BPA's Captain Jack Substation. The locations of the Energy Facility and its related or supporting facilities are shown in Figure 2-1, and Figure 2-2 shows the BLM-owned parcels.

The proposed Energy Facility would be fueled by natural gas from the existing PG&E Gas Transmission Northwest (PG&E GTN) pipeline and delivered through a 4.1-mile natural gas pipeline that would be constructed from the Bonanza Compressor Station along the rights-of-way of existing Klamath County roads. The natural gas pipeline is expected to be 20 inches in diameter.

Water would be needed by the proposed Energy Facility to generate steam for the combined-cycle operation, and for demineralized water production, potable water and sanitary systems, and service water. The water supply well system would consist of an existing well and two additional water supply wells. The water supply well system would be configured and constructed to withdraw water only from the deep zone aquifer and would be isolated from the shallow zone aquifer and surface water. The existing well, known as the Babson well, was originally drilled to depths exceeding 5,000 feet for oil and gas exploration in the 1920s and has partial obstructions at depths of 1,870 and 2,050 feet.

The Babson well would be sealed through the shallow zone aquifer and through approximately 1,100 feet of nonbearing rock to approximately 1,500 feet below the ground surface (bgs). No other Langell Valley area wells or water rights in the deep aquifer system are known to exist. Two additional water supply wells would be drilled to a depth of approximately 2,000 feet bgs.

Once withdrawn, the water would be pumped through a 2.8-mile water supply pipeline to a raw water storage tank located at the Energy Facility site. Under average annual ambient conditions with supplemental duct firing, approximately 22 gallons per minute of process wastewater would be discharged by the Energy Facility. Three alternatives for disposal of the process wastewater are proposed: 1) beneficial use of the water for irrigated pasture, 2) evaporation in an onsite, lined evaporation pond, or 3) temporary storage onsite and hauling to an offsite wastewater treatment plant (WWTP) for disposal.

The principal components of the proposed action are as follows:

- A new 1,160-MW, air-cooled, natural gas-fired, combined-cycle electric power generation plant located near Bonanza, Oregon, on 50.6 acres of land
- A new 7.2-mile electric transmission line to deliver electricity from the proposed Energy Facility to BPA's Captain Jack Substation
- A new 4.1-mile natural gas pipeline to deliver fuel to the proposed Energy Facility site
- A water supply well system consisting of an existing well and two additional water supply wells
- A 2.8-mile water supply pipeline between the water supply wells the Energy Facility
- A 31-acre irrigated pasture area for beneficial use of process wastewater. Process wastewater would be delivered via a 3,770-foot irrigation pipeline.
- A 20-acre evaporation pond if process wastewater is managed by an onsite, lined evaporation pond
- A 4.7-acre stormwater infiltration basin
- A 1.5-acre stormwater pond

Each of these components is described in greater detail in the next subsections, and a comparison of project impacts is shown in Table 2-1.

2.3.1 Electric Power Generation Facility

2.3.1.1 Site Location

The proposed Energy Facility site is located 3 miles south of Bonanza, Oregon, on the east side of West Langell Valley Road No. 520 in Klamath County. Access to the site would be from Langell Valley Road No. 520 (see Figures 2-1, Site Map, and 2-2, Facility Map). The Energy Facility site is located on 50.6 acres of property totaling 749 acres in Sections 22, 23, 25, and 26 of Township 39 South, Range 11 East. The property is currently undeveloped, and has historically been used for agricultural activities as described below. Figure 2-2 shows BLM-owned parcels.

Specific criteria are considered to determine the location when siting a combined-cycle power plant such as the proposed Facility. Key criteria include proximity to transmission, fuel supply, and water supply. Additional criteria include site size, topography, geotechnical issues, flooding potential, transportation, environmental impacts, and nearby residences.

The project location selected for the proposed Facility had the highest potential for meeting these criteria, as described in the following list:

- **Electric transmission interconnect**. The Energy Facility site would connect to the existing BPA Captain Jack Substation, which is part of the California Oregon Intertie, known as the “Super Highway Crossroads” of Energy for the Pacific Northwest and California.
- **Fuel supply**. The PG&E GTN Bonanza Compressor Station is located 4.3 miles from the Energy Facility site.
- **Water supply**. The Energy Facility would use water from a deep aquifer with no demonstrated connection to the shallow water system.
- **Site size**. The land area fits the proposed Energy Facility dimensions, including construction laydown areas needed during the building process.
- **Topography**. The topography would allow sufficient cut and fill for a level Energy Facility site.
- **Geotechnical**. The soil is expected to be suitable, with sufficient stability and low potential for liquefaction.
- **Flooding potential**. The Federal Emergency Management Agency (FEMA) flood insurance rate map for the proposed Facility (panel number 410109 1250B) shows minimal flooding potential.
- **Transportation.** The Energy Facility site is located approximately 7 miles from the city of Malin, which has suitable rail for the construction and support of the proposed Facility.
- **Environment.** The proposed project would have no significant adverse effect on the environment with the implementation of mitigation measures. Mitigation and habitat improvement practices and measures that would be employed are described in more detail in the EIS and a Habitat Mitigation and Natural Area Revegetation Plan (the Revegetation Plan) that is part of the Biological Assessment (BA) (Appendix C to the EIS).
- **Nearby Residents.** The closest resident to the proposed Energy Facility site is located approximately 5,700 feet northwest of the Energy Facility. However, this resident would not be able to view the Energy Facility because of topography. The closest resident to the Energy Facility with an obstructed view is located approximately 6,700 feet southeast of the Energy Facility. The closest resident to the electric transmission line is located approximately 3,000 feet east of the electric transmission line. The closest resident to the water supply wells is located approximately 3,500 feet southwest of the water supply well site.

Eleven alternative sites were identified by the project proponent as having development potential. None of the alternative sites successfully met the criteria identified above.

2.3.1.2 Power Generation Facilities

The proposed Energy Facility would consist of four General Electric (GE) model 7FA (or equivalent) combustion turbine generators (CTGs), four three-pressure heat recovery steam generators (HRSGs), and two steam turbines. The Energy Facility would be fueled by natural gas used in the combustion turbines. Expanding gases from combustion would turn rotors within the turbines that are connected to electric generators. The hot gases exhausted from the combustion turbines would be used to produce steam in the HRSGs. The steam from two HRSGs would then be expanded through a steam turbine that drives its own electric generator, thus creating additional electrical energy. Spent steam from the HRSGs would be condensed and routed to the air-cooled condensers. Steam from the exhaust of the STG would be condensed in a surface condenser, with the condensate routed back to the HRSGs as boiler feedwater to complete the closed steam cycle.

The CTGs and HRSGs would be outdoor units with thermal insulation and acoustical attenuation. To increase steam-generating capacity, a duct burner system would be included in each HRSG. The duct burner would be single-fuel, using natural gas only. The duct burner would increase both the steam generated in the HRSGs and the CTG electrical output. Additional equipment dedicated to each power block would include surface condensers, air-cooled condensers, generator step-up transformers, electrical distribution gear, and associated ancillary equipment.

2.3.1.3 Site Facilities

Access to the site would be from West Langell Valley Road No. 520. In addition to the combustion turbines, steam turbines, and air-cooled condensers, the site would include a laydown and storage area, administrative/control room building, warehouse/maintenance building, water treatment facilities, raw water and demineralized water storage tanks, process wastewater storage tanks, stormwater pond, septic tank/leach field, and switchyard. If the onsite evaporation pond is used for process wastewater management, the process wastewater tanks would not be required.

The following are the approximate dimensions of major Energy Facility structures and visible features:

- Power generation equipment and systems: approximately 12 acres by 54 feet tall
- Stacks: approximately 150 to 200 feet tall
- Air-cooled condensers: approximately 4.3 acres and 125 feet tall
- Raw water storage tank: 113 feet in diameter and 40 feet tall
- Laydown and storage area: approximately 6.3 acres
- Administration/control room building: approximately 0.2 acre by 22 feet tall
- Warehouse/maintenance building: approximately 0.2 acre by 22 feet tall

- Water treatment facilities
  - Water treatment building—approximately 0.2 acre by 22 feet tall
  - Demineralized water storage tank—approximately 37 feet in diameter by 40 feet tall
- Wastewater alternatives
  - Beneficial use of the water for irrigated pasture: approximately 31 acres
  - Lined evaporation pond alternative: approximately 20 acres with 7-MG storage capacity
  - Temporarily storing onsite and hauling to an offsite WWTP for disposal: two wastewater storage tanks 100 feet in diameter and 40 feet tall
- Stormwater pond: approximately 1.5 acres
- Stormwater infiltration basin: approximately 4.7 acres
- Septic tank/leach field: less than 1 acre

2.3.1.4 Water Supply

The Energy Facility would use water from a deep aquifer system intercepted by an existing well known as the Babson well. (No other Langell Valley area wells or water rights in the deep aquifer system are known to exist.) A well system consisting of the Babson well and two additional water supply wells would be used to withdraw water from the deep zone aquifer. The water withdrawal would be subject to a water right permit issued by the State of Oregon.

During operations, the primary uses of water at the proposed Energy Facility would be for steam generation, demineralized water production, potable water and sanitary systems, and service water. Water also would be available for fire suppression. During construction, water would be used for dust suppression, compaction, vehicle and equipment cleanup, and miscellaneous construction-related uses. Drinking water for construction workers would be bottled water or other potable water trucked to the Energy Facility.

When operating, water use in the Energy Facility would vary daily and seasonally in response to fluctuating electricity demand and weather conditions. As a result, actual daily water use at the Energy Facility is estimated to vary from 0 gallons per minute (gpm) when the Energy Facility is offline up to a maximum of 210 gpm (0.30 mgd or 0.92 ac-ft/day or 0.47 cfs). For average annual conditions with duct firing, it is anticipated that the average withdrawal rate from the water supply wells would be approximately 72 gpm (0.10 mgd or 0.31 ac-ft/day or 0.16 cfs). In addition, 90 gpm (0.13 mgd or 0.40 ac-ft/day or 0.16 cfs) would be required to irrigate up to 16 acres of land between March 1 and October 31 of each year.

Water from the water supply well system would be pumped through a 2.8-mile, 6-inch-diameter water supply pipeline to a 3.0-MG raw water storage tank at the Energy Facility.

2.3.1.5 Fuel and Chemical Storage Facilities

Construction. During construction, fuels and chemicals anticipated to be used include diesel fuel, gasoline, lubricants and oils, solvents, paints, ethylene diamine triacetic acid (EDTA), and surfactant. The diesel fuel and gasoline would be stored in aboveground storage tanks that would be located within secondary containment. The chemicals would be stored in drums and containers located inside construction storage trailers. Spill kits with absorbent materials would be available in the event of a spill of hazardous chemicals.

Operation. Natural gas would be delivered from the existing PG&E GTN pipeline system through a 4.1-mile natural gas pipeline constructed from the Bonanza Compressor Station along the rights-of-way (ROW) of existing Klamath County roads. Natural gas would not be stored onsite.

There would be diesel fuel storage for the fire water pump at the Energy Facility and for the back-up generators at the water supply well system. The diesel fuel storage capacity would be approximately 100 gallons and 4,300 gallons (two tanks each with a capacity of approximately 2,150 gallons) for the fire water pump and back-up generators, respectively. Diesel would be purchased from fuel distributors. Vehicles used would be fueled and serviced offsite. No storage of fuels or lubricants for vehicles would be necessary onsite.

Lubricants and oils for the generators, turbines, transformers, and miscellaneous electrical equipment would be stored in drums and containers. The lubricants and oil would be stored indoors and within appropriate containment areas.

Water treatment chemicals would be stored in aboveground storage tanks or portable plastic tanks (totes). The water treatment chemicals include sulfuric acid, sodium hydroxide, EDTA, hydrazine, ammonia hydroxide, sodium hypochlorite, sodium bisulfite, sodium metabisulfite, sodium nitrite, organic phosphate, sodium phosphate, lime, soda ash, magnesium chloride, polymers, filter acid, and iron chloride. Cleaning fluids and detergents would be used for periodic cleaning of the combustion turbine blades. The chemicals would be stored in totes or aboveground storage tanks situated in the appropriate containment areas designed to hold the volume of the liquids stored plus freeboard, according to applicable regulations and best management practices (BMPs).

Aqueous ammonia would be stored in a 30,000-gallon aboveground storage tank. The tank would be contained within a bermed area and would be designed in accordance with applicable industry specifications. The tank would be equipped with a level gauge and would be monitored from the control room. The area for delivery of aqueous ammonia to the storage tank also would be bermed.

2.3.1.6 Laydown and Storage Areas

The proposed Energy Facility would have a 71.0-acre construction parking lot and laydown areas for pipe, tool and material storage, and trailers. During the life of the Energy Facility, major maintenance and construction projects would require a storage and work area. In addition, large items would require outdoor storage. An approximately 6-acre laydown and storage area would be part of the 50.6-acre Energy Facility site.

2.3.1.7 Fire Prevention and Control

Systems for fire prevention, detection, and control would be installed at the proposed Energy Facility. The systems would be installed in the buildings and yard areas as required by the National Fire Protection Association (NFPA) and the Facility insurer. The systems would be designed to meet local, state, and NFPA standards.

The main fire protection system would include a dedicated water storage system, hose stations, and fire pumps. Water would be supplied by the deep aquifer well system described in Section 2.3.4. A portion of the 325,000-gallon demineralized water storage tank would be dedicated to the fire protection system.

The fire detection system would continuously monitor the Energy Facility, provide indication of the location of fires, warn the Energy Facility personnel, and activate the fire protection system. The combustion turbine enclosures would include carbon dioxide fire-extinguishing systems.

Smoke detectors, heat detectors, manual alarm stations, and indicating devices would be installed throughout the Energy Facility. Portable fire extinguishers would be placed at key locations.

2.3.1.8 Wastewater Management, Beneficial Use, and Disposal

Construction. Wastewater would be generated during construction and testing/ commissioning of the Energy Facility from washdown of concrete trucks after concrete loads have been emptied; washing of exteriors of construction equipment and vehicles to remove accumulated dirt; rinsing of the water systems; and hydrostatic testing of the natural gas and water supply pipelines. Wastewater from concrete truck washdown and cleaning of construction equipment would be managed so that there would be no discharge offsite or discharge to surface waters. Wastewater from the flushing and hydrostatic testing (testing and commissioning wastewater) is estimated to be 6.5 MG. Hydrostatic testing and flushing would be performed sequentially with water filtered between steps so that water can be reused and recycled to the extent possible. During construction and testing/ commissioning, portable toilets would be provided for onsite sewage handling and would be pumped out and cleaned regularly by a qualified contractor.

Operation. The proposed Energy Facility would use water primarily for steam generation, demineralized water production, potable water and sanitary systems, and service water. Water also would be available for fire suppression. Process wastewater from the Energy Facility would be managed by one of three alternatives:

- Beneficial use of the water for irrigated pasture
- Evaporation in an onsite, lined evaporation pond
- Temporary storage onsite and hauling to an offsite WWTP for disposal

Irrigated Pasture Beneficial Use: If process wastewater is managed by beneficial use of the water for irrigated pasture, water developed during the winter months would be stored and combined with process water produced in the summer months to irrigate onsite acreage. The Energy Facility site and land immediately adjacent to the Energy Facility under option by the project proponent, encompasses sufficient acreage with soil types suitable for this activity. Process water can be managed without exceeding annual salt loading rates typical of nearby irrigated lands, or other facilities with permits to use similar water in a similar fashion. Approximately 31 acres would be required to manage the total volume of process water available without exceeding typical total dissolved solids (TDS) loading rates that currently result from irrigated agriculture in the area.

The process water would be used to improve grazing forage yield in areas currently without irrigation, and possibly to enhance the wildlife forage yield in habitat mitigation areas. This activity represents a beneficial use of the water that would not be made if it were evaporated or hauled offsite for disposal. The irrigated use would occur only in areas with well-drained soil and with suitable slopes to minimize the potential for surface runoff or erosion. The irrigated use would not occur in areas that are drained by subsurface drain tiles to minimize any potential discharges to surface water. Annual application rates would occur at levels substantially lower than gross irrigation requirements for full irrigation and the irrigated use would not result in recharge to groundwater during periods of irrigation.

Onsite Evaporation Pond: If process wastewater is managed by evaporation, an optional backup of a 20-acre evaporation pond sized to store approximately 7 MG and lined to protect groundwater would be used to manage process wastewater. The evaporation pond alternative is a contingency only and it would not be built until such time as it is determined that process wastewater management by irrigated pasture beneficial use does not function as designed. If the need for the evaporation pond occurs, the water treatment system at the Energy Facility would be changed to increase the cycling of the water and to reduce the quantity of wastewater to be discharged to the evaporation pond.

The evaporation pond would most likely be designed to operate passively. However, to reduce the size of the footprint, a spray enhancement system would be installed if it were economically viable. A wastewater stream pipeline would take wastewater from the Energy Facility to the evaporation pond. The evaporation pond would be designed and sized to contain sediment from the wastewater for the life of the plant with minimal need to clean out the sediment. There would need to be sufficient freeboard in the evaporation pond to account for sediment accumulation. The evaporation pond would be cleaned periodically and sludge and other solids that would accumulate from evaporation of the wastewater would be removed and disposed of at an approved landfill.

The pond would be designed to include a composite liner system for containment of waste-water and sediment. Bentonite would be added to the soil at the base of the evaporation pond, mixed to a depth of approximately 12 inches, and then compacted to achieve a permeability of greater than $1x10^{-6}$ centimeters per second (cm/sec). An alternative to the bentonite-treated soil would be to use a bentomat geotextile system. The bentomat geotextile system is available with a permeability as low as $5x10^{-9}$ cm/sec. A 60-mil HDPE liner would be placed over the bentonite-treated soil or the bentomat geotextile system, to form the top layer of the composite liner system.

Storage and Hauling to Wastewater Treatment Plant: If this alternative were to be selected, process wastewater would be managed by temporarily storing onsite and hauling to a WWTP for offsite disposal. The project proponent has contacted the two municipal WWTPs in Klamath Falls—the South Suburban Sanitary District and the City of Klamath Falls Sanitary District. The ability of these two WWTPs to accept wastewater from testing and commissioning of the Energy Facility and the wastewater from operation of the Energy

Facility is presently being evaluated. According to managers at both facilities, each would be required to evaluate whether they can meet the EPA categorical standard to accept industrial waste or whether local ordinance provides for acceptance of truck-hauled wastewater. During the life of the Energy Facility, other WWTPs may be constructed or considered for management of wastewater generated at the Energy Facility. The project proponent would arrange with a trucking company to routinely haul the wastewater stored in the wastewater storage tanks at the Energy Facility to the WWTP.

Sanitary wastewater from restroom and shower facilities would be routed to an onsite septic tank, which would discharge to a leach field. Approximate flows of up to 1,500 gallons per day or about 1 gpm are expected.

2.3.1.9 Stormwater Management

Construction. During construction, stormwater would be managed according to NPDES General Construction Permit 1200-C, issued by the Oregon Department of Environmental Quality (ODEQ), and an erosion and sediment control plan. In general, construction erosion control would consist of BMPs, including techniques such as hay bales, silt fences, and revegetation, to minimize or prevent soil exposed during construction from being carried off the site.

Operation. Stormwater would be managed by implementing BMPs such as containment, covering, good housekeeping, preventive maintenance, and spill prevention. The drainage from disturbed areas at the Energy Facility site would be designed to drain to a stormwater pond. The stormwater pond would be sized to detain approximately 750,000 gallons (2.3 acre-feet) of water based on a 25-year storm event.

Stormwater would be managed through three systems—the plant drains system, stormwater sewer system, and offsite stormwater diversion system.

Plant Drains System. The plant drains system would be routed through an oil/water (o/w) separator and then back into the raw water process for plant use.

Stormwater Sewer System. The stormwater sewer system is designed to accommodate a 100-year, 24-hour storm event and would collect stormwater from rooftops, parking lots, and landscaped areas. This storm sewer system would consist of ditches, culverts, and piping as required that are routed to the 1.5-acre stormwater pond. Two alternatives are available for managing the stormwater discharge from the stormwater pond. The preferred alternative would discharge the stormwater into a 4.7-acre infiltration basin. The infiltration basin is designed to allow the stormwater to infiltrate into the ground. The second alternative would discharge the stormwater into the West Langell Valley Road drainage ditch. From the point where the stormwater is discharged into the drainage ditch, the stormwater would travel approximately 8,000 feet before it discharges into the High Line Levee Ditch. The High Line Levee Ditch discharges into the Lost River.

Offsite Stormwater Diversion System. Stormwater run-on to the Energy Facility site would be prevented by diverting the water around the Energy Facility into natural drainages and the West Langell Valley Road drainage ditch. For the transmission line access roads, culverts would be properly sized and designed where the access road crosses intermittent creeks to facilitate flow of stormwater or snowmelt runoff and to minimize erosion. Access roads would be surfaced with gravel to minimize erosion. Drainage would be maintained along the route of the access roads to prevent ponding of stormwater or snowmelt runoff.

2.3.1.10 Solid Waste Management

Construction. A variety of nonhazardous, inert construction wastes would be generated during construction. The major solid waste types would be concrete waste from foundation construction, wood waste from wood forms used for concrete construction, and scrap steel. Additional wastes include erosion-control materials such as straw bales and silt fencing, and packaging materials for parts and equipment.

Generation of wastes from construction would be minimized through detailed estimates of materials needs and through efficient construction practices. Approximately 350 tons per month of solid waste would be generated. Wastes generated during construction would be recycled as much as feasible. Recyclable materials would be separated from the solid waste stream. Solid waste would be stored in onsite roll-off bins. Solid waste would be collected periodically by a private contractor and hauled to a licensed disposal facility. The nearest licensed facility is the Klamath County Landfill, located about 35 miles from the Energy Facility site.

During construction, fuels, lubricant chemicals, and welding gases would be handled by trained personnel. The material would be in controlled storage until used, and any empty containers or waste material would be segregated in storage and properly recycled or disposed of by licensed handlers.

Operation. The proposed Energy Facility would generate approximately 50 tons per year of conventional solid waste consisting of office trash, packing materials, and nonrecyclables. Solid wastes generated during operation would be recycled as much as feasible. Recyclable materials would be separated from the solid waste stream. Solid waste would be stored in onsite roll-off bins. Solid waste would be collected periodically by a private contractor and hauled to a licensed disposal facility. The nearest licensed facility is the Klamath County Landfill, located about 35 miles from the Energy Facility site. This landfill and the regional landfill, Roosevelt Regional Landfill in southern Washington, would accommodate solid waste generated by operation of the Energy Facility.

If onsite evaporation of the wastewater is selected as the preferred alternative, evaporation would leave a solid waste that would be occasionally removed for disposal in a licensed landfill. This solid waste is a nonhazardous solid waste composed of water-treatment chemicals and constituents concentrated from the raw water supply. Rabanco Companies confirmed that the Roosevelt Regional Landfill would accept and manage the sludge as "special waste," meaning that a unique identification number would be created by the landfill operator to track the sludge from the Energy Facility.

2.3.2 Electric Transmission Line

The proposed COB Energy Facility would include construction of an approximate 7.2-mile, 500-kilovolt (kV), alternating current (AC) electric transmission line running south from the Energy Facility to an interconnection at BPA's Captain Jack Substation. Approximately 38 transmission towers would be required. The transmission towers would consist of steel lattice structures assembled in sections near the transmission tower site. Each transmission tower contains three components: the legs, body, and bridge. Typical transmission towers would range in height from 100 to 165 feet, with most towers in the 105- to 110-foot range. On average, the towers would be spaced approximately 990 feet apart, with a range from 380 to 1,500 feet.

Transmission towers would rest on four concrete footings, each about 4 feet in diameter. Allowing room for access and workspace around the footings would result in a permanent footprint disturbance of approximately 60 feet by 60 feet at each transmission tower, and at nine transmission tower locations, approximately 100 feet by 150 feet of additional, permanent space would be required to ensure safety for vehicles and equipment. Footings would be placed in holes that are excavated, augured, or blasted. The design of the footings would vary based on soil properties, bedrock depth, and the soundness of the bedrock at each transmission tower site. The final configuration of the new transmission line (for example, exact number of transmission towers, transmission tower heights, and location of transmission towers) would depend on final design and engineering and geotechnical considerations. Figure 2-3 shows a typical transmission tower structure.

Typically, 500-kV AC transmission lines require three sets of wires (or "conductors"). Each set is referred to as a phase, and typically consists of a pair of bundled aluminum cables. One or two "shield wires" are placed near the top of the transmission structure, above the conductors, to shield the towers from lightning strikes.

An access road for travel by wheeled vehicles would be required for construction and to access the new electric transmission line for maintenance during operation. The access road would be designed for use by cranes, excavators, supply trucks, boom trucks, and line trucks. The access road would be surfaced with gravel. Approximately 6.6 miles of new access road would be required. The access road would be approximately 15 feet wide, and grades would be less than 15 percent. No permanent access roads would be constructed in cultivated or fallow fields. Where temporary roads are used, any disturbed ground would be repaired.

Based on review of a U.S. Geological Survey (USGS) quadrangle map and field work, only three intermittent creeks are present within the proposed electric transmission line corridor, and there are no visible perennial streams. Culverts that are properly sized and designed would be installed where the access road crosses intermittent creeks to facilitate flow of stormwater or snowmelt runoff and to minimize erosion.

Based on a planned 154-foot-wide electric transmission line easement, easement options have been obtained. Grading would occur within the easement at each transmission tower site and along the access road. The transmission tower sites may be graded to provide a relatively level work surface. During construction, staging areas would be needed where steel, spools of conductor, and other construction materials would be stored.

For safe and uninterrupted operation of the electric transmission line, vegetation would be cleared or trimmed. Clearing may be by removal of vegetation or by controlling vegetation so that it does not grow above a certain height. Considerations that influence the amount and type of clearing include vegetation species, height and growth rates, ground slope, wind and snow patterns, conductor elevation above ground, and clearance distance required between the conductors and other objects. Some form of clearing may be required to the edge of the 154-foot-wide easement. Any leaning or diseased trees that could fall into the transmission line or pose a threat to reliable operation would be removed. At transmission tower sites, all trees, brush, stumps, and snags would be removed, including root systems. The amount of clearing required is unknown at this time.

After construction, vegetation control would be necessary, and would include controlling noxious weeds and managing growing vegetation in and adjacent to the easement. Vegetation control would consist of manual, mechanical, biological, and/or chemical methods.

The project proponent would construct the electric transmission line to a final dead-end structure adjacent to the BPA Captain Jack Substation. BPA would be responsible for final interconnection with the substation. Interconnection work would include installation of bus work and bus ties, 500-kV breaker(s), isolation switches, and foundations; and extending the grounding system for the substation.

2.3.3 Natural Gas Pipeline

A new gas pipeline would be required to supply natural gas to the Energy Facility. It would connect to an existing PG&E GTN gas transmission system line through a 4.1-mile-long, 20-inch-diameter natural gas pipeline constructed from the Bonanza Compressor Station along the ROW of existing Klamath County roads.

Metering facilities would be located at either the Energy Facility or the compressor station and not in the natural gas pipeline easement. The peak operating pressure of the PG&E GTN system at the Bonanza Compressor Station is 911 pounds per square inch, gauge (psig). No compression of natural gas would be required.

The natural gas pipeline would be installed in a 36-inch-wide trench at a depth of about 4 feet. The trench would be backfilled with pipe zone material and then with native soil up to the original grade.

Easement options have been obtained for a planned 80-foot-wide easement needed for equipment staging and material laydown. The easement would be immediately adjacent to and along the Klamath County ROW for Harpold County Road No. 1097 and West Langell Valley Road No. 520. The route of the natural gas pipeline would cross the public roads in three places and an irrigation canal in one location. The crossings would be conventional bores underneath the public roads and an irrigation canal. The rest of the natural gas pipeline would be constructed by open trench methods.

In the areas where conventional bores would occur, additional temporary work space would be required on both sides of the road or irrigation canal. Excavations would be larger than in the open trench sections to accommodate (1) greater pipe depth, (2) sharp angles at the crossings, and (3) safe working conditions within the excavations. These excavations could be approximately 15 feet deep. The additional work space would be necessary to excavate the deeper ditch in a safe manner and to store the additional excavated soil.

Additional temporary work space of 40 feet (for a total of 120 feet) would be required along the north side of West Langell Valley Road near the Energy Facility site, where the natural gas pipeline route goes through an approximate 2,200-foot section of steep topography. The extra width would be needed for soil storage when leveling the easement to create a safe working platform for workers and equipment.

2.3.4 Water Supply Well System

Water would be needed by the Energy Facility for steam generation, demineralized water production, potable water and sanitary systems, and service water. Water also would be available for fire suppression. The source of water for construction and operation of the Energy Facility would be groundwater from a deep aquifer system intercepted by a well, known as the Babson well. No other deep aquifer system wells or water rights are known to exist in the Langell Valley area. A water supply system consisting of the Babson well and two additional water supply wells would be used to withdraw water from this deep zone aquifer.

Previous borehole geophysics and aquifer testing at the Babson well (CH2M HILL , 1994) indicated the presence of six groundwater-bearing zones within the upper 2,050 feet of the borehole. The project proponent proposes to use the three deep water-bearing zones that are present below a depth of 1,580 feet to supply water for the Energy Facility. These zones appear to be hydraulically separated from the shallow system by approximately 1,000 feet of non-water-bearing rock. The Babson well would be reconfigured, and the two additional water supply wells would be designed, to isolate the deep zone from the shallow zone system, and withdraw water only from the deep system. .

Development of the Babson well would consist of installing a seal in the well from the surface to approximately 1,500 feet bgs. This seal would consist of a 10-inch or 12-inch welded steel casing grouted in place to seal off the shallow aquifer system. As a result, the well would no longer draw water from the shallow water-bearing zones. The additional water supply wells would be a maximum diameter of 12 inches and the depth of the additional water supply wells is expected to be approximately 2,000 feet. Like the Babson well, the additional water supply wells would be cased and grouted to seal off the shallow aquifer system from the deep system in the wellbore.

An electrical pump with approximately 50 to 100 horsepower (hp) would be installed in each well. Because the deep aquifer system is under considerable confining pressure, the static water level in the wells would be approximately 20 feet bgs. Submersible pumps would be used. Surface features would include a pumphouse (approximately 20 feet by 30 feet with standard height walls) that would contain a heating, ventilation, and air conditioning (HVAC) system and lighting. On the discharge of the pump, a pump control valve would be needed for pump startup and shutdown procedures.

There is existing electrical service to the Babson well. However, this electrical service does not have sufficient capacity to accommodate the increased electrical load from the three 50 to 100-hp pumps. The local power company, PacifiCorp, would be responsible for upgrading the electrical service to accommodate the increased electrical load. Emergency back-up power to the pump would be provided by an onsite diesel generator. The generator would be located near the pumphouses but in a separate walk-in, weatherproof enclosure. The diesel fuel would be stored in an aboveground storage tank located within a secondary containment structure.

Water from the water supply well system would be pumped through a 2.8-mile, 6-inch-diameter water supply pipeline to a 3.0-MG water storage tank located at the Energy Facility.

The water supply pipeline would be constructed within a 60-foot-wide easement on land under ownership options by the project proponent, except for portions of the route that cross Klamath County roads. The route of the water supply pipeline would cross two Klamath County roads: East Langell Valley Road and Teare County Road 1161. In addition, the water supply pipeline would cross an irrigation ditch operated by the Langell Valley Irrigation District in three locations. The crossings would be directionally bored underneath the public roads and irrigation ditch. The rest of the water supply pipelines would be constructed by open trench methods.

In the areas where conventional bores would occur, additional temporary work space would be required on both sides of the road or irrigation canal. Excavations would be larger than in the open trench sections to provide room for workers to safely work down in the excavations. The excavations would be approximately 15 feet deep. The additional work space would be necessary to excavate a safe ditch and store the excavated soil.

A temporary access road for travel by wheeled vehicles would be required for construction. The access road would be designed for use by cranes, excavators, supply trucks, boom trucks, and line trucks. The access road would be removed and revegetated after construction of the water supply pipeline.

The water supply pipeline would be installed in a 36-inch-wide trench at a depth of about 4 feet. The trench would be backfilled with pipe zone material and then with native soil up to the original grade. Figure 2-4 shows a typical section of the water supply pipelines.

2.3.5 Construction Schedule and Activities

Based on conditions of the electric power market after approval of the SCA, the project proponent may decide to construct the Facility in one phase or two phases. If the Facility is constructed in two phases, construction of the second phase may start up to 2 years after the first phase starts commercial operation.

If the Facility is constructed in one phase, construction is expected to take 23 months. If the Facility is constructed in two phases, the first phase of construction is expected to take approximately 18 months.

Because the conditions of the power market are volatile, the project proponent may choose not to start construction of the Facility until 3 years after the SCA is approved.

For the single phase construction, the construction workforce is expected to average 352 employees, with a low of 147 during the first 2 months and final 4 months of construction, and a peak of 543 during the fifteenth and sixteenth months of construction.

Equipment used at the site would include light and heavy trucks, backhoes, bulldozers, graders, cranes, air compressors, welding machines, and power hand tools. Foundation piling equipment may also be used. Some specialized boring equipment would be used to install the pipeline under existing roads and irrigation canals.

2.4 Other Projects Potentially Contributing to Cumulative Impacts

The level of analysis of cumulative impacts is commensurate with the potential for impacts, resources affected, scale of the impact, and other factors. This treatment of cumulative impacts is consistent with the EPA guidance for determining cumulative impacts (*Consideration of Cumulative Impacts in EPA Review of NEPA Documents*, 1999)

2.4.1 Other Energy Projects

There are two other potential energy generation projects near the Energy Facility site: the Klamath County water power project and the Klamath Generating Facility. The Klamath County water power project is proposed to be sited to the southeast of the COB Energy Facility. The Klamath Generating Facility is proposed to be sited about 3 miles south of Klamath Falls, Oregon, adjacent to the existing Klamath Cogeneration Project.

The Klamath County water power project would be a "closed system" pumped storage project with manmade upper and lower reservoirs. The eventual construction of the water power project is uncertain at this time given its preliminary nature. Energy Recycling Company has submitted an application to the Federal Energy Regulatory Commission for a preliminary permit to secure a license for the Klamath County water power project under Part I of the Federal Power Act. Energy Recycling Company has previously held a permit for the project, and the project proponent worked on a similar project at the site from 1991 to 1998 (the Lorella Pumped Storage Project). Despite presentations to potential development groups, the Lorella Pumped Storage Project never progressed to the development stage, and it is not certain that its predecessor, the Klamath County water power project, will do so, either.

Furthermore, according to the application, water for the Klamath County water power project may be obtained from nearby groundwater sources or the proposed Energy Facility. It is unlikely that the water power project will obtain water from local groundwater sources for the following reasons:

- The shallow aquifer system (above approximately 500 feet) is a heavily appropriated basalt aquifer that is in varying degrees of hydraulic connection with the Lost River.
- The state of Oregon is currently adjudicating Klamath River Basin water rights for those with claims dating prior to 1909.

Because the project has been through various stages of conceptual development and permitting for 12 years and obstacles remain, the Klamath County water power project has not been considered in the discussion of cumulative impacts as a reasonably foreseeable future action.

The COB Energy Facility would use water from the deep aquifer system pumped through the Babson well, rather than from shallow groundwater sources. (On April 24, 2002, the project proponent submitted a water right application to the Oregon Water Resources Department [OWRD] and on April 22, 2003, OWRD issued a proposed final order [PFO] that included a draft water right permit.) No other Langell Valley area wells or water rights in the deep aquifer system are known to exist.

Klamath Generation, LLC, a wholly owned subsidiary of PacifiCorp Power Marketing, Inc., submitted an application for a site certificate on December 26, 2001. The project is called the Klamath Generating Facility and if constructed would be a 542.2-MW natural gas combined-cycle system (two gas combustion turbine generators and one or two steam turbine generators) with power augmentation. The proposed facility would be located about 3 miles south of Klamath Falls, Oregon. The proposed site is adjacent to the existing Klamath Cogeneration Project. On April 23, 2002, the applicant withdrew its request for expedited review. ODOE is continuing to review the application under the standard review process.

The Klamath Generating Facility has been considered in the discussion of cumulative impacts on air quality.

2.4.2 Other Recent or Proposed Projects

Other recent projects or proposed projects that have been identified in the vicinity of the Energy Facility include the following:

Lane/Klamath Fiber Consortium: This project involves the acquisition of the fiber optics system between Springfield, Oregon, and Merrill, Oregon. Only a small portion of the project lies in the vicinity of the proposed project. Because this project is currently constructed in existing rights-of-way and construction impacts have been mitigated, there are no past, present, or future environmental impacts contributing to cumulative impacts.

Sykes Telecommunication: This project involved the construction of a new 400-employee call center in Klamath Falls, Oregon. The project has been completed. Agricultural land and natural habitat have not been affected. No water discharges to surface or groundwater have occurred, and there are no air emissions related to the project. The project does create additional cumulative traffic on regional roads. Based on the nature of the project and its relative distance from the proposed Energy Facility, there are no significant cumulative impacts related to the proposed Energy Facility.

Escend Technologies: Escend Technologies designs business-to-business software. Escend opened an office in Klamath Falls in 2000, employing approximately 60 people. The firm estimates that it will grow to 200 employees by 2005. Existing facilities are located in the urban area and do not affect similar types of land and habitats impacted by the proposed Energy Facility. Escend uses city services for water, wastewater, and solid waste. The facility does not have air emissions. Future impacts on regional traffic may occur with increased employment, but these impacts are expected to be spread around the region. Such impacts are not expected to contribute substantially to cumulative traffic impacts in the vicinity of the proposed Energy Facility.

Thermo Pressed Laminates: This manufacturing facility produces laminate materials for furniture, cabinets, and other uses. The facility was constructed in Klamath Falls in 2002 at an existing industrial site. Water supply, wastewater, and solid waste services are provided through the city of Klamath Falls. The facility has minor air emissions and does not have an air permit. Emissions from this facility would be represented by background.

Electro Scientific Industries: Electro Scientific Industries makes capital equipment for the semiconductor and electronics components industries. In 2001, the firm opened a manufacturing facility in Klamath Falls. An additional 200 jobs are anticipated by 2006. Except for air emissions, this facility is beyond the resource impact area identified for cumulative impacts. The facility has minor emissions and does not have an air permit. Emissions from this facility would be represented by background.

Other types of development that potentially could contribute to cumulative impacts include agricultural development, road construction, and land development. Agricultural development historically has impacted the area more than other land uses. The Energy Facility, through land application of the wastewater, would contribute minor cumulative impacts to the present and potential future agricultural development in the area. There are no planned or known road construction projects or land development projects proposed for the project area.

2.5 Other Alternatives

2.5.1 Alternative Strategies for Electrical Supply and Demand Management

In the early 1990s, BPA prepared a number of NEPA documents that analyzed the environmental effects of various alternative policies and business strategies. In 1993, BPA published a document titled *Resource Program Final Environmental Impact Statement* (DOE/EIS-0162). This EIS included a detailed analysis of the environmental consequences of alternative strategies for managing demand and increasing the supply of electrical energy in the Pacific Northwest. Alternatives analyzed consisted of various combinations of conservation, development of renewable resources (including hydropower, geothermal, wind and solar power), efficiency improvements, cogeneration, combustion turbines, nuclear power, and coal.

In the mid-1990s, responding to changes in the electric utility market, BPA modified its business plan and prepared a document titled *Business Plan Final Environmental Impact Statement* (DOE/EIS-0183). It was published in June 1995 and incorporated a number of earlier NEPA documents by reference, including the *Resource Program Final Environmental Impact Statement*.

The *Business Plan Final Environmental Impact Statement* included a description of how it would be used in BPA's decisionmaking process, as follows:

> "This BPA EIS is a programmatic EIS: that is, it addresses 'umbrella' policies and concepts. Approaches, strategies, and general agency direction—not site-specific actions—are recommended here. As the Administrator implements his broader policies and business strategies, other more specific business decisions such as the development of individual energy generation resources and transmission facilities will have their own environmental review and decision processes. These additional environmental reviews will look at site-specific actions, using the information and decisions in this EIS as a base to understand how they fit into more global policies and business strategies. This process is called 'tiering,' where more specific additional information on potential environmental consequences adds to the understanding for subsequent decisions."

The purpose of tiering is to promote orderly and properly sequenced decisionmaking for complex, multistage projects that may have adverse effects on the environment. It also avoids unnecessary and duplicative technical analysis. Broad policies and strategies are first examined in a programmatic EIS. The site-specific impacts of an individual project that is needed to implement the larger policy or strategy are then examined in a site-specific EIS. The analysis of the broad political and strategic alternatives is included in the site-specific EIS by reference and does not need to be repeated.

Consistent with this approach, this EIS for the COB Energy Facility confines itself to analysis of the site-specific environmental impacts of the proposed action. The analyses of larger policy and strategy alternatives are contained in the programmatic Business Plan EIS and Resource Program EIS and are included here by reference.

2.5.2 Alternatives Considered but Eliminated from Detailed Analysis

The project proponent considered various alternatives before developing the proposed Energy Facility. Minimization of impacts to the environment and residents were the most important criteria used in the company's evaluation of alternative sites and the development of proposed Energy Facility features. The proposed Energy Facility site was chosen because it is close to an existing natural gas pipeline and an existing electric transmission line, and thus would minimize the need for construction of new gas and electrical transmission facilities. This offers both economic and environmental advantages.

Alternative transmission corridors were evaluated for the natural gas pipeline, the water supply pipeline, and the electric transmission line. Alternative wastewater discharge scenarios and cooling also were considered. The following sections describe the alternatives considered for these facilities and the reasons the alternatives were eliminated from detailed analysis.

2.5.2.1 Alternative Natural Gas Pipeline

The alternative natural gas pipeline route would have been a more direct, 3.8-mile route from the Bonanza Compressor Station to the Energy Facility. This alternative route would have been located away from the public road ROW and run over two mountains between the compressor station and the Energy Facility site.

The majority of the land along the alternative natural gas pipeline would have been zoned Forestry Range (lands of mixed farm and forestry uses), with some Exclusive Farm Use–Cropland (EFU-C) and EFU–Cropland/Grazing (EFU-CG), and a very small area of Industrial Land at the compressor station. Land uses observed along the alternative natural gas pipeline route included irrigated pasture, a dairy, industrial land (the compressor station), open rangeland/woodlands managed by BLM and private landowners, and dryland farming and cattle grazing on a fallow field.

Even though the alternative natural gas pipeline route would have been slightly shorter than the proposed route (3.8 miles versus 4.1 miles), the alternative was eliminated from further consideration because construction would have taken place on steep slopes, increasing the likelihood of erosion, disturbance, and the potential risk of damage from landslides or sloughing. The route would also have crossed an ancient landslide, which would pose risk to the safe operation of the high-pressure natural gas pipeline.

The proposed route would not face the same disadvantages as the alternative route. Furthermore, the proposed alternative would not impact the operation of the irrigation canals during its construction or operation. No cultural resource sites, wetlands, or sensitive plants were identified during field studies.

2.5.2.2 Alternative Water Supply Pipeline

The project proponent chose to obtain water supply for the Energy Facility from the deep aquifer accessible from the Babson well. Because virtually all existing water supply in the Klamath Basin is from the shallow aquifer or surface sources, this approach minimized environmental impacts on water resources in the region by making use of this little-utilized source.

The 8.0-mile alternative water supply pipeline route from the Babson well to the Energy Facility site would have been substantially longer than the proposed route. The alternative route would have been located along the public road ROW. This route would have originated at the water supply well system, traveled southeast along East Langell Valley Road, and then along several other public road ROWs to West Langell Valley Road, continuing northwest to the raw water supply storage tank at the Energy Facility site.

Zoning along the route of the alternative water supply pipeline is EFU-CG, EFU-C, and FR. The majority of the land use along the alternative water supply pipeline route is irrigated pasture, with a small amount of juniper woodland, sagebrush scrub, and Ponderosa pine habitats. Numerous wetland resources occur along this route, including two high-quality cattail marshes. Many of the remaining wetlands are excavated channels located within a relict lake bed. These wetland areas are mapped on the National Wetland Inventory (NWI) as palustrine emergent wetlands.

The alternative water supply pipeline was eliminated from further consideration because (1) the alternative route is not direct and is 5.2 miles longer than the preferred route, (2) the alternative route would have greater wetland impacts and mitigation requirements, (3) impacts to local traffic would be significantly greater because the alternative route uses the public road ROW for almost the entire route, and (4) the presence of irrigation canals that parallel the roads for hundreds of feet would be expected to prevent the use of the public ROW for staging and construction activities.

2.5.2.3 Alternative Electric Transmission Line

Alternatives for interconnecting the proposed project to the regional transmission system are limited because of the proposed project’s location in a remote area with few existing high-voltage lines. However, three alternatives were considered for connecting the Energy Facility with the regional power grid: (1) the preferred 7.2-mile electric transmission line from the Energy Facility to the BPA Captain Jack Substation, (2) an alternative, 7.9-mile electric transmission line that also connects the Energy Facility with the BPA Captain Jack Substation, but runs parallel to the existing Pacific Northwest/Pacific Southwest (PNW/PSW) intertie transmission lines, and (3) connecting to the regional power grid by tying directly into the existing PNW/PSW intertie transmission lines that transect the Energy Facility site.

The third alternative would not require an electric transmission line. This alternative was eliminated because BPA, PGE, and PacifiCorp prohibit direct connection of new generation to the PNW/PSW intertie for protection of system reliability. As result, this alternative was ruled out immediately and no further analysis conducted.

The second alternative for the electric transmission line presented technical, economic, and resource concerns greater than those presented by the preferred alternative. The rejected electric transmission line alternative is known as the "ROW alternative" in reference to facility locations proposed along existing transmission line rights-of-way. The ROW alternative would have required building a new electric transmission line from the Energy Facility to the Captain Jack Substation within a separate 200-foot-wide easement, necessitating property acquisition. The easement would have been 7.9 miles long and run parallel and adjacent to the existing electric transmission ROW corridor and 250 feet from the existing BPA/PGE/PacifiCorp electric transmission lines (three transmission lines collectively known as the PNW/PSW Intertie).

A comparison of the ROW alternative and the preferred electric transmission line route is presented in Table 2-2 of this chapter.

The ROW alternative would cover a larger area than the preferred alternative. The rejected alternative would be 7.9 miles long and would require 44 towers as compared to 7.2 miles and 38 towers for the preferred route. The rejected alternative would have a 200-foot easement that would cover almost 190.8 acres, while the preferred route would have a 154-foot-wide easement that would cover approximately 134.0 acres. The ROW alternative would require 52 acres of BLM-owned land, while the preferred route would require 44 acres of BLM-owned land.

Zoning along the route of the alternative electric transmission line is EFU, FR, and F. Land uses observed along the alternative electric transmission line route include existing electric transmission lines, fallow agricultural fields used for cattle grazing, residents, a lake, selective historical timber harvesting of ponderosa pine woodland, open rangeland/ woodlands managed by Federal and private landowners, and the PG&E GTN interstate gas pipeline system.

A cluster of residences are located in the upper half of the route. These residences are approximately 400 feet from the westernmost existing transmission line. Electric and magnetic fields (EMFs) would increase for the residences along the alternative transmission line. If the alternative transmission line were to be constructed, these residences would only be approximately 200 feet from the centerline of the transmission line, or approximately 100 feet from the edge of the 200-foot easement. In addition, visibility impacts would occur at residential locations as a result of clearing trees and vegetation to within 100 feet (the edge of the 200-foot easement described above) of the residences.

During field surveys of the ROW alternative, three cultural resource sites were identified. The amended National Historic Preservation Act (NHPA) of 1966 established a Federal policy of avoiding or minimizing adverse effects to cultural resources when planning and constructing federally-involved projects. As such, the proposed electric transmission line has been moved to avoid these resources.

During field surveys in June and July 2002, several bald eagles were observed foraging along the alternative electric transmission line easement. There is a resident population of bald eagles at McFall Reservoir approximately 1,750 feet west of the alternative electric transmission line route.

BPA wants to maintain the flexibility to construct a fourth transmission line adjacent to the three existing lines, and the project proponent's ROW electric transmission line alternative would not be consistent with that objective. In addition, BPA has raised technical concerns about the feasibility of another electric transmission line adjacent to the existing electric transmission lines.

2.5.2.4 Alternative Cooling Scenario

The project proponent considered water cooling for the Energy Facility. Peak water demand for water cooling would be approximately 7,590 gallons per minute (gpm) (10.9 million gallons per day [gpd]). Average annual water demand would be approximately 5,390 gpm (7.6 million gpd). These values include 90 gpm for seasonal irrigation. A draft water right permit was issued by OWRD in a PFO dated April 22, 2003. This draft water right allowed water withdrawal from the deep zone aquifer at a rate up to 7,500 gpm for industrial uses and 90 gpm for seasonal irrigation use.

Subsequently, the project proponent decided to switch to air cooling from wet cooling in response to feedback from the community. Amendment No. 1 to the SCA was filed with EFSC on July 25, 2003, to switch to air cooling.

On August 19, 2003, OWRD provided ODOE with a revised recommendation and draft water right permit reflecting a reduction in the industrial water requirement to a maximum instantaneous rate of 210 gpm. The 90 gpm for seasonal irrigation use remained unchanged.

TABLE 2-1
Summary of Affected Environment and Environmental Consequences

Environmental Resource	Existing Conditions	Impact of Proposed Action/Mitigation	Impact of No Action Alternative
Geology, Soil, and Seismicity	The Energy Facility site is located in a subbasin of the larger Klamath Basin in south-central Oregon. The Klamath Basin is a composite graben that forms the westernmost structural trough of the Basin and Range physiographic province. The Klamath graben is bounded by predominantly north- to northwest-striking normal faults.	**3.2.1** Landslides present a low risk to the proposed Energy Facility. If, upon further evaluation, the risk of landslide increases, additional mitigation measures would be implemented, including further adjustment of the transmission tower locations and installation of instrumentation on the towers to monitor for movement. **3.2.2** The Energy Facility would have a moderate impact on land identified as high-value soil in Klamath County. The proposed project would restore 91 acres of fallow land to high-quality deer habitat. Another 145 acres of habitat would be improved in the wildlife mitigation area. In addition, a facility retirement and site restoration approach would support restoration of the Energy Facility site to its current agricultural use. The approach uses topsoil salvaging and replacement, and standard farming practices. **3.2.3** Limited erosion would occur during construction with the implementation of best management practices (BMPs). **3.2.4** Soil erosion during operation of the Facility would be limited by stormwater control features and implementation of BMPs from a National Pollutant Discharge Elimination System (NPDES) permit and an erosion and sediment control plan. **3.2.5** The risk to human safety and harm to physical property as a result of seismic hazard would be minimal at the Energy Facility. Facilities would be constructed to Uniform Building Code standards for seismic design. **3.2.6** For the process wastewater management alternative involving beneficial use of the water for irrigated pasture, projected loading rates of total dissolved solids (TDS) would be limited to prevent buildup of salts in soil. The projected loading rates of the individual constituents of the process water do not indicate any other significant soil or crop hazard resulting from irrigation by process wastewater or salt-tolerant species. Agricultural soil would not be adversely impacted by the land application of process wastewater. The process wastewater would be applied to the pasture at agronomic rates during the irrigation season and at an	No changes to existing conditions would occur.

TABLE 2-1
Summary of Affected Environment and Environmental Consequences

Environmental Resource	Existing Conditions	Impact of Proposed Action/Mitigation	Impact of No Action Alternative
		instantaneous application rate less than the infiltration rate of the soil. Irrigation would not be conducted during periods of frozen or saturated soil to prevent erosion and generation of surface runoff. The process wastewater quality would generally be of equal or better quality than the shallow groundwater and Lost River water used for irrigation to lands around the beneficial use area.	
Hydrology and Water Quality	The only perennial surface water body in the Facility vicinity is the Lost River. Intermittent seasonal drainages also exist within the area. In addition, shallow and deep aquifers underlie the area.	**3.3.1** Water for the Energy Facility would be diverted from a deep system aquifer, which does not appear to be hydraulically connected to surface water bodies. No mitigation is proposed for the water withdrawal from the deep zone aquifer, but as an additional layer of protection, the water right would require operational monitoring and appropriate mitigation if any impacts are discovered to the shallow zone aquifer or surface water. The existing and two new water supply wells would be cased and sealed through the shallow zone aquifer and 1,100 feet of non-water bearing volcanic rock to a depth of approximately 1,500 feet below the ground surface (bgs) No water would be diverted from the Lost River. To reduce water requirements the Energy Facility would be designed to be air cooled. To further reduce water requirements, water would be recycled and reused from the plant drains, evaporative cooler blowdown, and heat recovery steam generator (HRSG) blowdown. **3.3.2** Wastewater and stormwater discharge during Facility construction and operation could affect surface and groundwater quality. BMPs for management of stormwater would be used to safeguard water quality during construction and operation. Onsite stormwater would be recycled (plant drains system) or discharged to an infiltration basin (storm sewer system). Wastewater management would be by one of three options: beneficial use of the water for irrigated pasture, an evaporation pond, or storage and hauling to an offsite wastewater treatment plant (WWTP). **3.3.3** Chemical spills at the proposed Energy Facility could affect surface and groundwater quality.	No changes to existing conditions would occur.

TABLE 2-1
Summary of Affected Environment and Environmental Consequences

Environmental Resource	Existing Conditions	Impact of Proposed Action/Mitigation	Impact of No Action Alternative
		BMPs and compliance with applicable regulations would avoid or minimize such impacts.	
Vegetation and Wildlife	The project area is located within the Klamath Ecological Province (East Cascades Ecoregion), on the eastern side of the Cascade Mountains. This region is characterized by large basins surrounded by ancient lake terraces and basaltic fault block mountains. Elevations range from around 4,000 to 8,400 feet. The soil in the area is derived from basaltic parent material and generally have loamy surface horizons overlaying loamy to clayey subsurface horizons. The climate is characterized by warm, dry summers and cool, moist winters. The average annual precipitation in Klamath County is 14 inches, of which only 27 percent occurs during the growing season.	**3.4.1** Construction and operation of the proposed Energy Facility could cause a temporary or permanent loss of vegetation and wildlife habitat. The proposed project would restore 91 acres of fallow land to high-quality deer habitat and another 145 acres of habitat would be improved in the wildlife mitigation area. Mitigation measures would be implemented during construction to limit disturbed areas to those needed to ensure practical and safe working conditions, to identify off-limits area, and to revegetate disturbed areas. **3.4.2** Construction and operation of the proposed Energy Facility would create noise and lighting that could disturb wildlife. BMPs would be implemented to reduce disturbances. Workers would receive training regarding wildlife and habitat and safe vehicle speeds. **3.4.3** Bald eagles and other birds could be injured or killed by collisions with power lines. Bird flight diverters would be installed. **3.4.4** Construction and operation of the proposed Energy Facility would disturb less than 0.5 acre of wetlands. Directional boring techniques and a minimum amount of fill would be used to avoid impacts to wetlands. **3.4.5** For the process wastewater management alternative involving beneficial use of the water for irrigated pasture, constituents in the process wastewater would not be expected to be toxic to wildlife. A Screening-Level Ecological Risk Assessment (ERA) following U.S. Environmental Protection Agency (EPA) and Oregon Department of Environmental Quality (ODEQ) guidance was conducted. The results of the ERA indicate that none of the constituents evaluated would be considered to present significant risk to ecological receptors.	No changes to existing conditions would occur.

TABLE 2-1
Summary of Affected Environment and Environmental Consequences

Environmental Resource	Existing Conditions	Impact of Proposed Action/Mitigation	Impact of No Action Alternative
Fish	Surface waters within the project area support various species of fish, including one federally and state-listed endangered species. Construction and operation of the Facility would not affect fisheries resources in the area.	**3.5.1** Construction of new access roads along the electric transmission line corridor would result in less than 0.5 acre of impact to wetlands related to intermittent creeks. Construction during the dry season (if possible) is recommended as a mitigation measure to avoid the presence of fish and minimize erosion and sedimentation. Culverts would be installed.	No changes to existing conditions would occur.
Traffic and Circulation	The existing network of roads surrounding the proposed facility includes West Langell Valley Road, East Langell Valley Road, Harpold Road, Oregon Route (OR) 70 (ODOT #23), OR 50, and OR 140. These local roads currently have low average daily traffic volumes and low average yearly accident rates. Levels of service are generally A or B, which are considered a high level of operations. These five roads have a high-quality asphalt surface.	**3.6.1** During construction, roadways in the vicinity of the Energy Facility would experience a decrease in level of service. Construction activities would be scheduled during off-peak hours and a carpooling program would be offered. **3.6.2** Vehicles weighing more than 80,000 pounds (maximum legal load limit) could cause some visible damage to county roads. Before and after conditions would be documented. If damage occurs, the proposed project would restore pavement to previous condition. **3.6.3** Operation of the Energy Facility would generate additional traffic. No mitigation measures are recommended.	No changes to existing conditions would occur.
Air Quality	The proposed Facility is located in an area currently classified as attainment for all criteria air pollutants. The closest air quality data are collected at Klamath Falls, 34 miles to the northwest. Air quality in the project area is expected to be significantly better than Klamath Falls. Oregon Department of Environmental Quality (ODEQ) air quality data summaries available on the Web site indicate that the 24-hour National Ambient Air Quality Standard (NAAQS) for particulate matter less than 10 microns in diameter (PM_{10}) has not been exceeded at Klamath Falls since 1992. No exceedance of the annual PM_{10} standard has occurred in the last 10 years. Monitoring for $PM_{2.5}$ began in July 1998, and has not measured an exceedance of either the proposed annual or	**3.7.1** Construction would cause short-term emissions of fugitive dust and construction equipment exhaust. BMPs would be issued to control fugitive dust and other incidental emissions. **3.7.2** Operations would not cause impacts. **3.7.3.** Operation of the Energy Facility would result in emissions of greenhouse gases. The proposed project would pay approximately $13.6 million to The Oregon Climate Trust, which would use these funds to finance CO_2 mitigation projects. **3.7.4.** Operation of the proposed Energy Facility would result in emissions of hazardous air pollutants.	No changes to existing conditions would occur.

TABLE 2-1
Summary of Affected Environment and Environmental Consequences

Environmental Resource	Existing Conditions	Impact of Proposed Action/Mitigation	Impact of No Action Alternative
	24-hour NAAQS. There has been no exceedance of the 1-hour carbon monoxide (CO) NAAQS in the last 11 years, and the 8-hour NAAQS has not been exceeded since 1991.	Emission-reducing equipment would be continuously monitored to minimize emissions. **3.7.5.** Operation of the Energy Facility could impact Air Quality-Related Values in federally managed Class I areas in the region; however, modeling results show pollutants and haze would have a significant impact. No mitigation measures are recommended. **3.7.6.** Operation of the Energy Facility would not result in significant odor emissions. No mitigation measures are recommended.	
Scenic and Aesthetic Values	This is a predominantly undeveloped area devoted to forests and farming. A number of aesthetic and scenic resources, such as national forests, existing and proposed wilderness trails, and scenic highways surround the proposed Energy Facility.	**3.8.1** Visual impacts to scenic and aesthetic resources could potentially result from the stacks and transmission towers for the electric transmission line; however, these Facility features would be in the background of any views. The proposed Energy Facility would not impact designated scenic areas. No mitigation measures other than those included in the proposed project, such as painting facilities to blend with the landscape and using nonglare, low-impact lighting, are recommended. **3.8.2** Impacts from Facility lighting would be minimal. See mitigation measures for Impact 3.8.1.	No changes to existing conditions would occur.
Cultural Resources	Three archaeological sites were identified during field surveys of the project area. All three sites are likely to be eligible for listing on the National Register of Historic Places (NRHP) and would qualify as an archaeological site under the Oregon statutes. Two of these sites (35-KL-2175 and PAS-3) are characterized by dispersed lithic scatter containing waste flakes (the by-product of stone tool manufacture), and tools. The remaining site (PAS-4) is a series of four, partially buried stone features that are of cultural and religious value to The Klamath Tribes.	**3.9.1** None of three known cultural sites would be affected by construction and operation of the Facility. The electric transmission line and the water supply pipeline have been moved from their original locations to avoid any impacts. **3.9.2** Unknown cultural resources could be adversely affected by the proposed project. A Cultural Resources Management Plan (CRMP) would be developed in coordination with The Klamath Tribes. The Plan would identify specific protocols and procedures for protecting known and unknown cultural resources. Archaeological monitoring would occur during construction to prevent accidental impacts to the known cultural sites and any resources discovered during construction.	No changes to existing conditions would occur.

TABLE 2-1
Summary of Affected Environment and Environmental Consequences

Environmental Resource	Existing Conditions	Impact of Proposed Action/Mitigation	Impact of No Action Alternative
Land Use Plans and Policies	The Facility is located in a rural area where elevations range from approximately 4,000 to 8,400 feet. The majority of the lowland areas have been converted to agricultural use. The agricultural lands include cultivated crops, irrigated pasture, unimproved pasture, and fallow fields. There are a few developed areas with residential, agricultural, and industrial uses such as farm homes, dairies, the Pacific Gas & Electric Gas Transmission Northwest (PG&E GTN) compressor station, and Captain Jack Substation.	**3.10.1** The proposed Facility would permanently disturb a total of 108.7 acres of land during the 30-year operating life of the Energy Facility, including an approximate 50.7 acres of land within the Klamath County Big Game Winter Range SRO. The proposed project would restore 91 acres of fallow field to habitat and improve another 145 acres of habitat in the wildlife mitigation area. **3.10.2**. Operations at the Energy Facility site would have limited, if any, impact on agricultural activities. No mitigation measures are recommended. **3.10.3** Construction of the Energy Facility would temporarily impact agricultural activities. BMPs would be employed during construction to minimize and avoid impacts to agricultural activities. **3.10.4** Construction of the Energy Facility could have temporary impacts to dairy operation. In addition to the BMPs that would be employed during construction to minimize and avoid impacts to agricultural activities, herbicides would not be used and activities would be coordinated with dairy owner. **3.10.5** The Energy Facility would have permanent and temporary impacts to pasture land. BMPs would be employed during construction to minimize and avoid impacts to pasture land. In addition, temporary fences and gates would be constructed so that at convenient intervals livestock could cross construction areas, and permanent fences if damaged would be repaired or replaced. **3.10.6** Construction impacts would occur to rangeland/woodlands along the natural gas pipeline, water supply pipeline, and the electric transmission line, and permanent impacts to rangeland/woodlands along the electric transmission line. BMPs would be employed during construction to minimize and avoid impacts to rangeland/woodlands. Additional mitigation measures would be implemented to avoid and repair impacts.	No changes to existing conditions would occur.

TABLE 2-1
Summary of Affected Environment and Environmental Consequences

Environmental Resource	Existing Conditions	Impact of Proposed Action/Mitigation	Impact of No Action Alternative
		3.10.7 Permanent impacts would occur to forest ranges along the electric transmission line. BMPs would be employed during construction to minimize and avoid impacts to forest ranges. Additional mitigation measures would be implemented to avoid and repair impacts.	
Socioeconomics	Population has been growing in the vicinity of the Facility at less than 1 percent per year during the last decade, which was approximately one-half of the state's growth rate. In early 2002, the unemployment rate in Klamath County was approximately 13 percent, primarily owing to declines in the construction and mining sectors. In 2000, housing vacancy rates were around 3 percent for owner-occupied housing and 9 percent for rental housing.	**3.11.1** The proposed Energy Facility would result in a limited short-term and long-term population increase. No mitigation measures are recommended. **3.11.2** The proposed project would result in an increase in short-term and long-term employment opportunities in the area. No mitigation measures are recommended. **3.11.3** The proposed Energy Facility would have a short-term impact on housing. New residents would likely settle in the communities within a 30-minute driving distance. No mitigation measures are recommended.	No changes to existing conditions would occur.
Public Services and Utilities	Water and sewer service is provided inside urban growth boundaries (UGBs) of the project area. Outside of UGBs, water is supplied by private wells and sewage goes to individual septic tanks. Solid waste is disposed of at two landfills. Police protection outside UGBs is provided by the Klamath County Sheriff and the Oregon State Patrol. Rural fire protection around Bonanza and Klamath Falls is provided by Klamath County Fire Districts #1, #4, and #5, and the Bonanza Rural Fire Protection District. Health care is available at the Merle West Medical Center in Klamath Falls; however, the closest trauma center is in Bend. The four school districts serving the project area report declining enrollment.	**3.12.1** The proposed Energy Facility would have limited, if any, effects on the capacity of local utilities during construction, and no effects during operations. No mitigation measures are recommended. **3.12.2** The proposed Energy Facility would not affect the level of service provided by local public services. Onsite security would be provided during construction. No other mitigation measures are recommended.	No changes to existing conditions would occur.

TABLE 2-1
Summary of Affected Environment and Environmental Consequences

Environmental Resource	Existing Conditions	Impact of Proposed Action/Mitigation	Impact of No Action Alternative
Health and Safety	The Energy Facility site consists primarily of scrub brush with limited cattle grazing. Limited industrial and commercial utility uses exist in the area. Development in the vicinity of the Energy Facility site consists of widely distributed residences. Intermittent noise includes traffic on local roads, agricultural activities, and distant overhead aircraft. Continuous noise is absent.	**3.13.1** A natural gas leak could occur, posing a risk of fire. **3.13.2** Diesel fuel could leak from the storage container, posing a fire risk and possible contamination of soil. **3.13.3** Aqueous ammonia could spill or ammonia vapor could be released to the atmosphere, posing a health risk. **3.13.4** Hazardous nonfuel substances could spill, with the potential to harm people at the Energy Facility and in the surrounding area. **3.13.5** A fire could occur at the Energy Facility, posing a threat to workers and nearby people and structures. **3.13.6** The high-voltage electric transmission line could cause electrical shocks directly and from induced charges. **3.13.7** Electric and magnetic fields (EMFs) would increase but would be well within allowable limits. **3.13.8** Operation of the proposed Energy Facility could affect noise levels but would be within limits allowed by state statute. **3.13.9** Construction of the proposed Energy Facility could affect noise levels. Mitigation measures for the proposed project include compliance with applicable Federal, state, and local regulations governing health and safety and the handling and storage of hazardous materials and fuels. No mitigation measures are recommended beyond those proposed by the project. A barrier wall would be reserved as a contingency mitigation measure. The wall would be installed if a noise exceedance is detected during Facility performance testing.	No changes to existing conditions would occur.

TABLE 2-2
Comparison of Preferred and Alternative Electric Transmission Lines Routes

Criteria	Preferred Route	Alternative Route[1]
Attributes		
Number of towers	38	44
Electric transmission line route length	7.2 miles	7.9 miles
Permanent easement width	154 feet	200 feet
Total permanent easement	134.0 acres	190.8 acres
Total Easement Area		
Total Exclusive Farm Use-(EFU) zoned land	17.0 acres 0.9 mile	12.1 acres 0.6 mile
Total Forest-zoned land and Forestry-Range-zoned land	117.0 acres 6.3 miles	177.2 acres 7.3 miles
Total BLM-owned land	44 acres	52 acres
Permanent Disturbance (includes tower base, roads, and loss of functional use)		
EFU-zoned land	5.3 acres	1.24 acres
Ponderosa Pine Woodland to be cleared, including some merchantable timber	12.4 acres	60 acres
Juniper Woodland to be cleared, not considered merchantable timber	31.6 acres	118 acres
Wildlife habitat by ODFW Category 2[2]	31.6 acres	4 acres
Wildlife habitat by ODFW Category 3[2]	25.7 acres	13 acres
Other Resource Impacts		
Wetlands	Three intermittent creeks within right-of-way	Three intermittent creeks within right-of-way
Cultural resources	No cultural resource impacts. Route modified to avoid cultural sites identified during survey Closest known cultural resource site is 1,800 feet	Known culturally sensitive area. Previous ethnographic studies conducted with Modoc elders in 1994 produced oral testimony suggesting the presence of traditional cultural properties in the Bryant Mountain area. Closest known cultural resource site is 4,500 feet for west side and 3,500 feet for east side
Endangered species	Approximately 4,000 feet from bald eagles observed at McFall Reservoir	Approximately 1,750 feet from bald eagles observed at McFall Reservoir
Raptor mortality	Single line using bird flight diverters	Cluster of four electric transmission lines cause “net effect,” therefore increased risk of raptor mortality.[3] No flight diverts on existing lines.
Visual	New electric transmission line in area where not previously located	New electric transmission line clustered with existing lines

TABLE 2-2
Comparison of Preferred and Alternative Electric Transmission Lines Routes

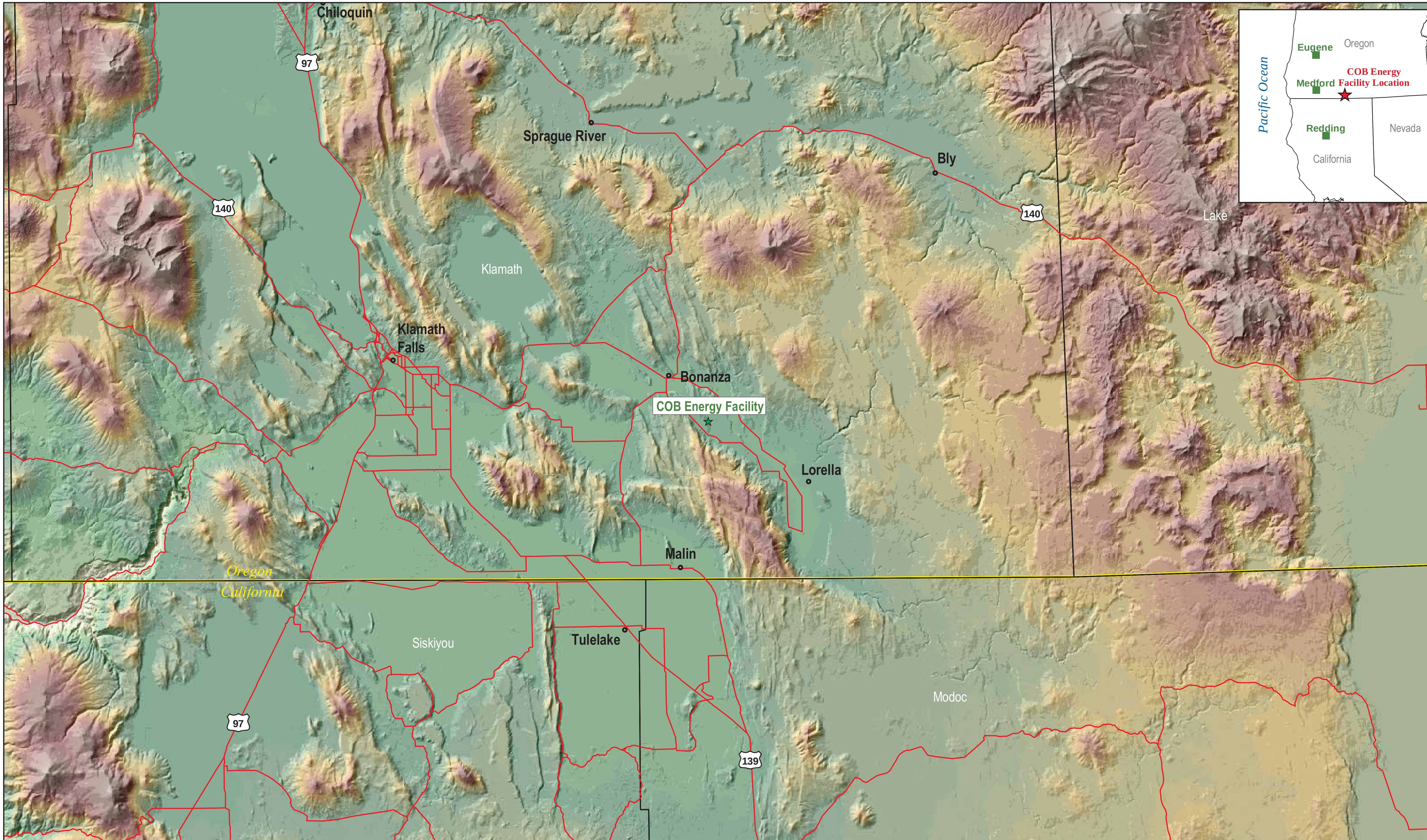
Criteria	Preferred Route	Alternative Route[1]
Engineering and Safety Issues		
Proximity to occupied dwelling (feet)	3,000 feet	400 feet for west side; 1,000 feet for east side
Geotechnical considerations	Routed around a historical landslide	None known
Other constraints	Worked with landowners to develop route that is acceptable	Two sharp-angle structures: one where BPA line turns and heads west to Captain Jack and the second to enter Bay 2 at Captain Jack

ODFW = Oregon Department of Fish and Wildlife

[1] Information for the parallel route was based on analysis of the preferred route and environmental work for a pump storage project conducted in the mid-1990s. Route-specific surveys for cultural resources, rare plants, and wildlife have not been conducted.

[2] Permanent disturbance calculated for loss of forage habitat only owing to construction of roads and tower bases; does not include clearing of timber that may be required but is not considered forage habitat.

[3] Avian Power Line Interaction Committee, "Mitigating Bird Collisions With Power Lines: The State of the Art in 1994," page 21, 1994 (authors: Wendy M. Brown, Sidney Gauthreaux, A. D. Miller).



Legend
Roads
Counties
States

N
1 inch equals 6 miles
0 1.5 3 6 Miles

Figure 2-1
Site Map
COB Energy Facility
Bonanza, OR

PEOPLES ENERGY RESOURCES

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Figure 2-1
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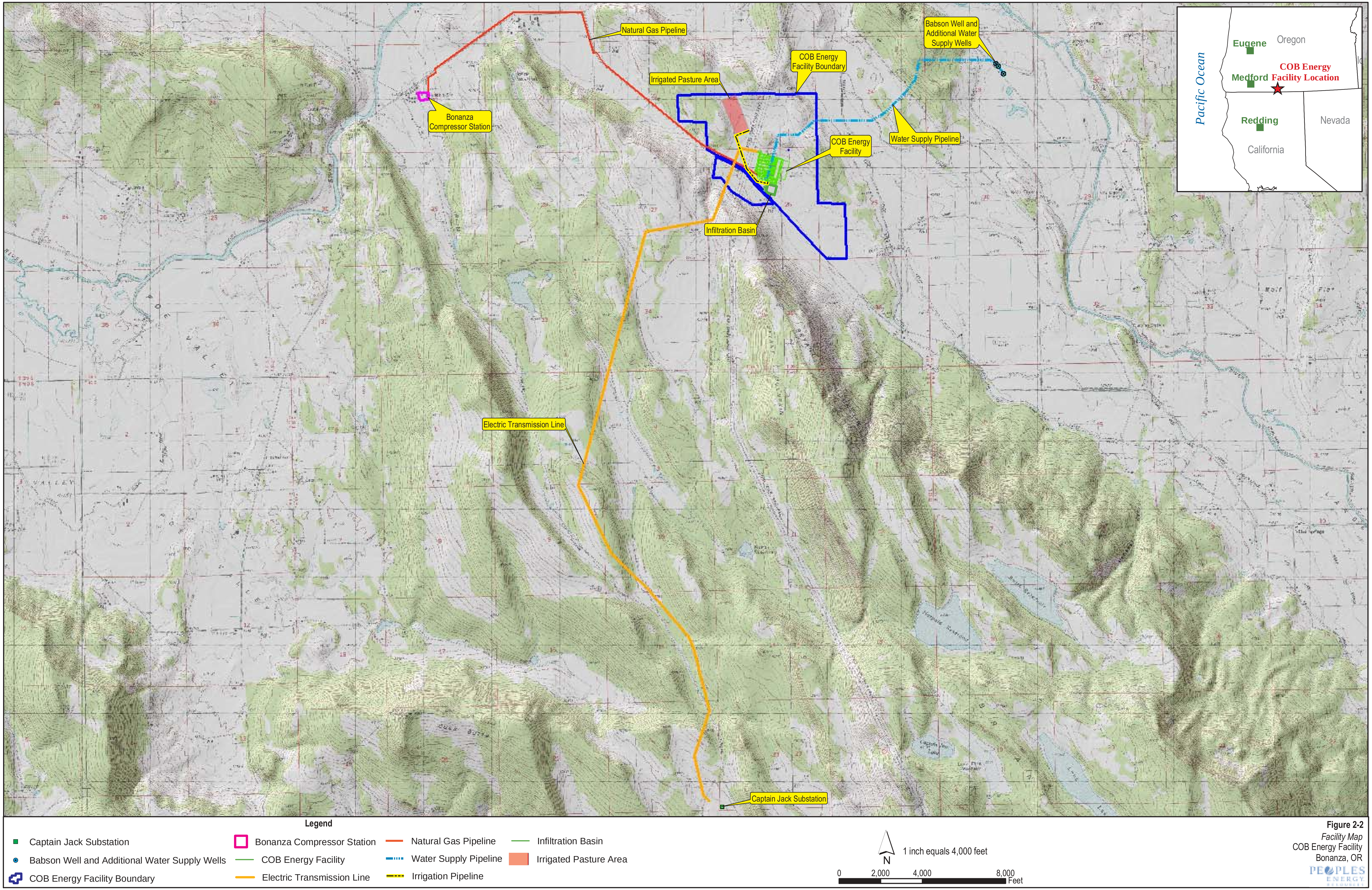

Figure 2-2
Facility Map
COB Energy Facility
Bonanza, OR

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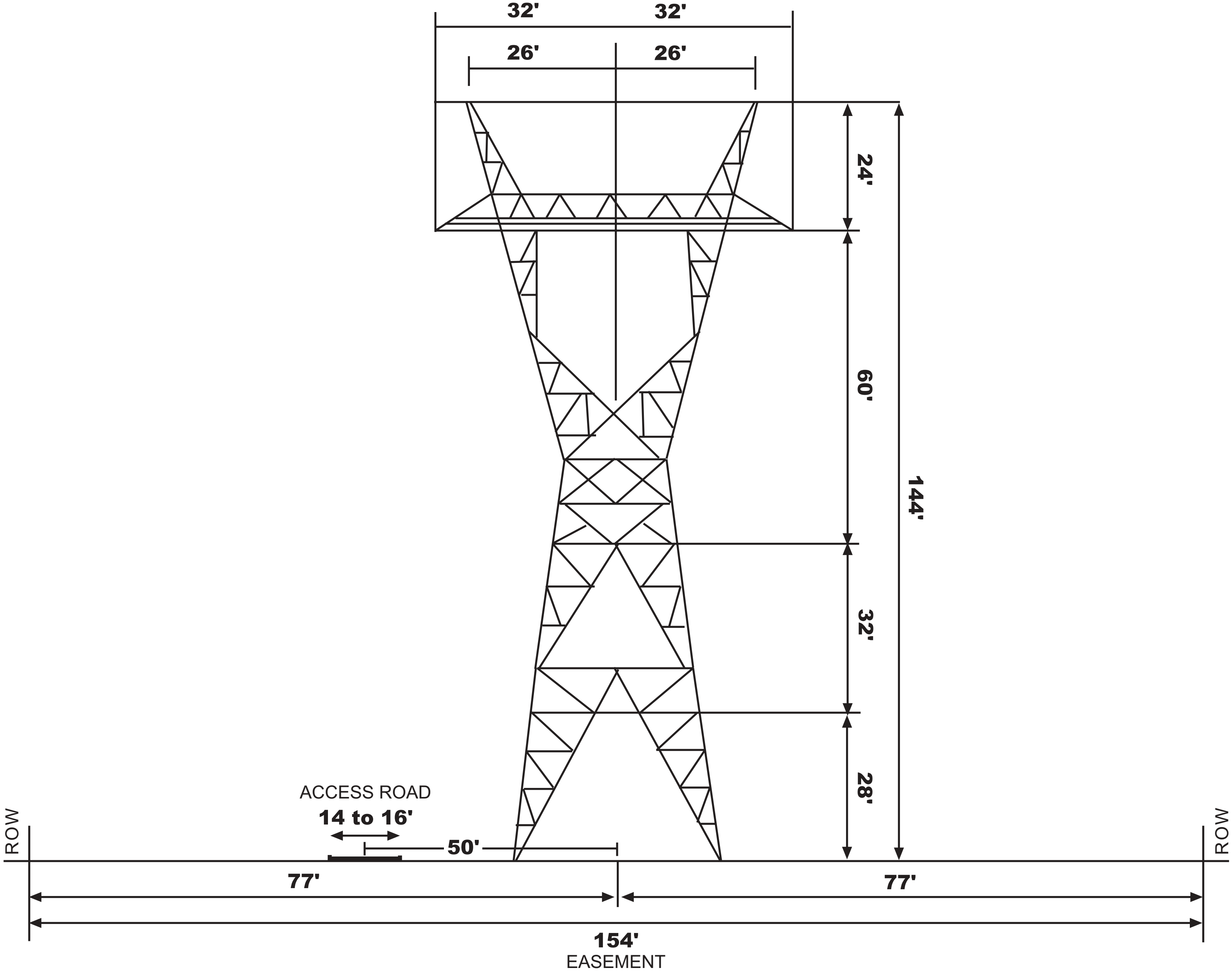

NOTES:

1. TRANSMISSION TOWER IS LATTICE.
2. CONDUCTORS COULD BE HORIZONTAL OR VERTICAL.
3. ACCESS ROAD MAXIMUM GRADE IS LESS THAN 15 PERCENT.

Figure 2-3
Typical Transmission Tower Structure
COB Energy Facility
Bonanza, OR

Figure 2-3
8.5 x 11
back

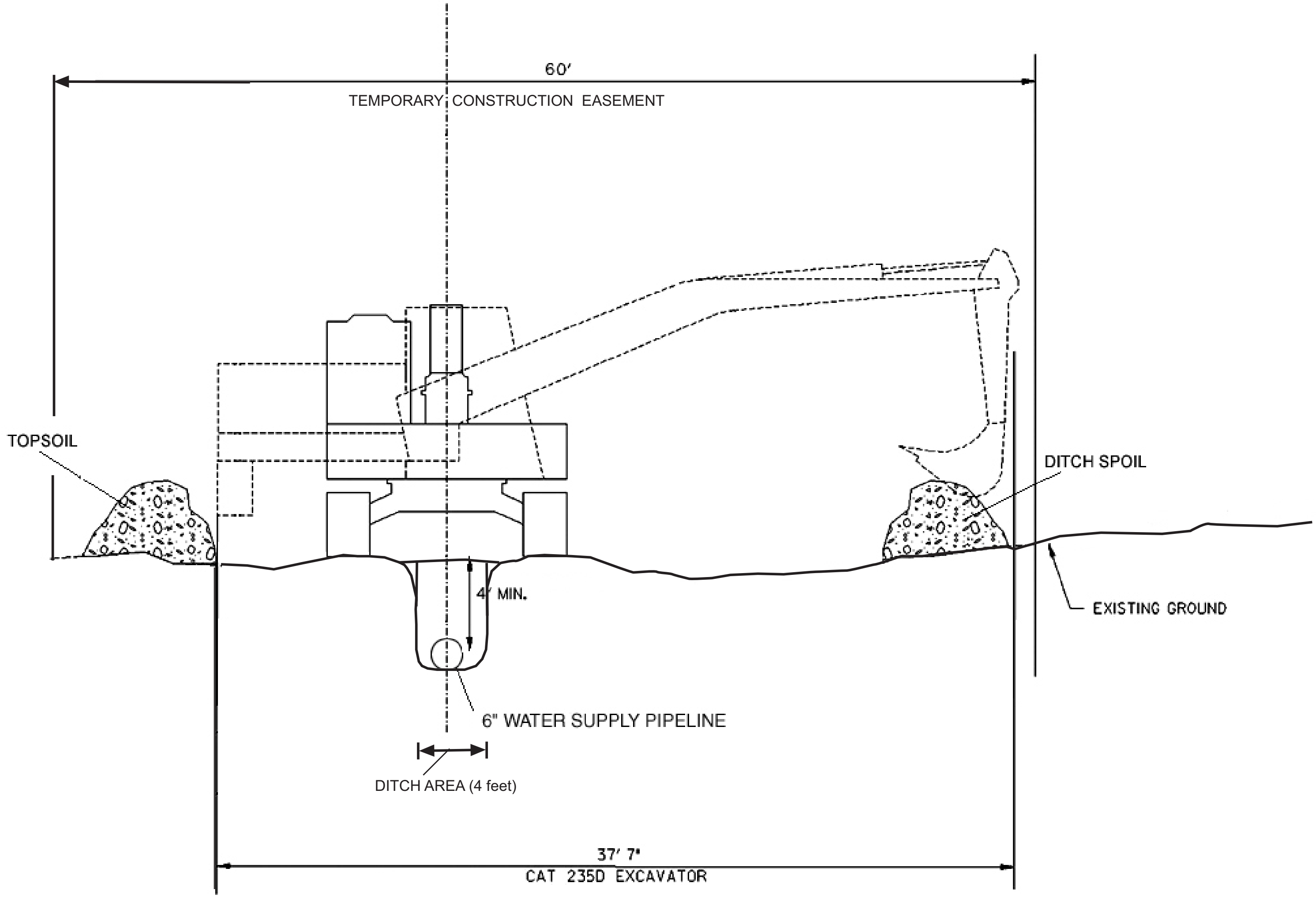

Figure 2-4
Typical Water Supply Pipeline Configuration
COB Energy Facility
Bonanza, OR